SECOND REPORT

ON

EXPERIMENTAL PSYCHOLOGY:

UPON THE DIAGRAM TESTS.

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PROFESSOR CHARLES SEDGWICK MINOT.

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DURING the past year a large number of postal cards were distributed, each bearing the printed request : " *Please draw ten diagrams on this card, without receiving any suggestion from any other person, and add your name and address.*"

The committee has received for examination 501 postal cards with diagrams upon them. A few of the cards 'had more than 10 diagrams upon them, and of such cards only the first 10 diagrams on each were counted. A few cards had less than 10 diagrams.

The cards were divided into 3 sets ; 1, men ; 2, women ; 3, without names. Each set of cards was numbered, and the diagrams on each card numbered. The tabulation was then begun according to this scheme : —

FIGURE — DIAMONDS.

Men.		Women.		No name.	
Card.	Diagram.	Card.	Diagram.	Card.	Diagram.
16	3	6	9	2	2
20	1	8	3	6	1
27	8	10	1	8	10
etc.		etc.		etc.	
Diagrams, total no. 28		44		8	

The cards and original tabulations have been preserved, and are in the charge of the Secretary of the Society.

The number of cards were for men, 310 ; for women, 169 ; no name, 22, total 501. The number of figures which have been tabulated is 83. The results are given in the following table, in which the figures have been arranged according to their relative frequency. The numbers in the first column refer to the original manuscript tabulations.

TABLE I.

|		Women.	Men.	No name.	Total.
8	1 Circles	60	140	9	209
7	2 Squares	61	105	8	174
4	3 Equilateral triangles . . .	58	95	7	160
14	4 Crosses	53	103	4	160
25	5 Letters of the alphabet . .	52	30	0	82

TABLE I. — *Continued.*

			Women.	Men.	No name.	Total.
9	6	Diamonds	28	44	8	80
50	7	Oblongs, horizontal . . .	27	50	1	78
53	8	Inscribed circles	22	56	0	78
12	9	Stars	28	46	3	77
1	10	Faces profile to the left . .	21	33	7	61
14	11	Houses	19	35	2	56
52	12	Rhombi	15	41	0	56
59	13	Scrawls	14	32	7	53
30	14	Other animals and heads .	12	28	8	48
33	15	Flowers	28	11	7	46
34	16	Leaves	20	25	0	45
10	17	Hexagons	13	28	1	42
13	18	Cubes	17	24	1	42
5	19	Right-angled triangles $\llcorner$.	9	27	0	36
48	20	Figures of men	6	21	5	32
60	21	Scrolls	16	16	0	32
80	22	Inscribed squares	14	18	0	32
21	23	Hearts	9	20	3	32
51	24	Oblongs, vertical	15	15	1	31
49	25	Squares with crosses . . .	16	11	3	30
16	26	Octagons	13	13	2	28
3	27	Faces, not in profile . . .	12	14	1	27
6	28	Right-angled triangles $\triangle$.	5	16	3	24
22	29	Moons	8	15	1	24
31	30	Hour-glasses $\bowtie$	11	8	1	20
24	31	Card spots	6	12	1	19
44	32	Spirals	4	12	1	17
76	33	Pentagons	11	5	1	17
11	34	Flags	6	8	2	16
62	35	Digits	4	12	0	16
63	36	Right-angles	3	11	2	16
32	37	Arrows	5	9	1	15
36	38	Books	3	12	0	15
37	39	Ships	5	9	0	14
39	40	Trees	3	10	1	14
77	41	Tools	6	8	0	14
54	42	♧	4	8	1	13
57	43	Bottles	4	9	0	13
41	44	Boots	6	6	0	12
18	45	Mugs	3	6	1	10
26	46	Hands	6	4	0	10
20	47	Hats	5	4	0	9
23	48	Sun	2	5	2	9
27	49	Horses	2	7	0	9
29	50	Cats	3	4	2	9
40	51	Vases	4	5	0	9

TABLE I. — *Concluded.*

		Women.	Men.	No name.	Total.
43	52 Anchors	1	8	0	9
47	53 Apples	5	3	1	9
56	54 Eyes	2	6	1	9
2	55 Faces, profile to the right .	3	5	0	8
82	56 Steps	2	4	2	8
83	57 Dishes	6	2	0	8
38	58 Branches	2	5	0	7
84	59 Signs of music	5	2	0	7
17	60 Pitchers	2	4	0	6
19	61 Chairs	3	3	0	6
42	62 Keys	2	4	0	6
61	63 Skull, and skull and cross bones	0	6	0	6
81	64 Punctuation marks . . .	3	3	0	6
28	65 Dogs	2	2	1	5
64	66 Clocks and watches . . .	4	1	0	5
68	67 Architectural plans . . .	1	3	1	5
75	68 Engines	1	4	0	5
66	69 Kites	1	3	0	4
70	70 Graves	1	3	0	4
71	71 Feathers	2	2	0	4
72	72 Spoons	1	3	0	4
79	73 Musical instruments . . .	2	2	0	4
35	74 Arms	2	1	0	3
45	75 Pears	2	1	0	3
65	76 Wheels	2	1	0	3
69	77 Candlesticks	0	2	0	2
74	78 Forks	0	2	0	2
46	79 Pineapple	0	1	0	1
55	80 Ear	0	1	0	1
58	81 Corkscrew	0	1	0	1
67	82 Bells	1	0	0	1
73	83 Knives	0	1	0	1

This table shows that there is an enormous preponderance of a few figures, a great preponderance of some others, and a certain preponderance of still others. The very simplest geometrical figures rank first, as will be seen still more strikingly if some of the diagrams which are now classed separately are put together into larger groups, but which, of course, are natural ones. Thus: there are circles, both plain, 209; and with inscribed figures, 78; of squares plain, 174; with cross lines inscribed, 30; and with other figures inscribed, 32. Of triangles, equilateral, 160; right-angled turned to the right, 36;

right-angled turned to the left, 24. Other figures bounded by four straight lines; oblongs, horizontal, 78; vertical, 31; rhombi, 56; diamonds, 80. Geometrical figures bounded by a few straight lines; hexagons, 42; cubes, 42; octagons, 28; hour-glasses, 20; pentagons, 17.

Thus we have,

Circles	287
Squares	236
Triangles	220
Four-sided figures [1]	245
Other straight-sided figures [1]	149

making of these very simple figures 1,137, or over one-fifth of the total number. If we add to these, stars 77, flags 16, and arrows 15, the total rises to 1,245, or almost one-fourth (1,250) of the whole.

The following tables, II. and III., bring out still further the character of the drawings.

<div align="center">

TABLE II.

FIGURES DRAWN WITH STRAIGHT LINES.

</div>

Lines.	Men.	Women.	No Name.	Totals.
1	16	5	0	21
2	78	41	2	121
3	260	138	16	414
4	378	190	28	596
5	110	64	11	185
6	139	93	9	241
7	41	25	6	72
more than seven (7)	415	243	36	694

<div align="center">

TABLE III.

GEOMETRICAL FIGURES DRAWN WITH CURVED LINES.

</div>

Lines.	Men.	Women.	No Name.	Totals.
1	199	83	10	292
2	85	71	9	165
3	38	25	1	64
4	26	35	3	64
5	12	5	1	18
6	8	2	1	11
7	2	1	1	4
more than seven (7)	26	36	1	63

<div align="center">

[1] Cf. Table II., also Table III.

</div>

Table II. shows that 2,344 diagrams were drawn exclusively with straight lines, and 1,337 diagrams with less than six straight lines. Table III. shows that 681 diagrams were drawn exclusively with simple curved lines, and that 603 diagrams were drawn with less than six such lines. To the significance of these tables we recur later.

Next to the circles, squares, triangles, and four-sided figures, come the faces ; profiles facing to the left, 61 ; profiles to the right, 8 ; other faces 27 ; or 96 in all.

Then follow,

Letters of the alphabet 82
Houses 56
Irregular scrawls 53

If we look at Table I., we see that, as there classified, there are 25 diagrams which are found on the cards 30 or more times. These first 25 diagrams occur in all 1,772 times, or on the average 70.9 times each.

Of the diagrams which are more or less often repeated, an interesting minority represent natural and artificial familiar objects, as can be conveniently seen by the following : —

TABLE IV.

Animals, etc.		Plants.		Manufactured Objects.	
Men	32	Flowers . . .	46	Houses . . .	56
Hands . . .	10	Leaves . . .	45	Books	15
Horses . . .	9	Trees . . .	14	Ships	14
Cats . . .	9	Apples . . .	9	Tools	14
Dogs	5	Branches . .	7	Bottles . . .	13
Ears	1	Pears	3	Boots	12
Arms . . - .	1	Pineapples . .	1	Mugs	10
				Hats	9
				Vases	9
				Anchors . . .	9
				Steps	8
				Dishes	8
				Pitchers . . .	6
				Chairs	6
				etc.	

Another group of diagrams may be classed as professional figures, such as surveyors' instruments, accurate pictures of engines, or parts thereof ; bones, sections of the spinal cord ; musical instruments, architectural plans, and of such many more. On the 501

cards we find 54 diagrams which belong unquestionably under this head, but they are from only 10 cards, and those all by men. On the other hand, among the women's cards there are 4 on which the 10 diagrams make a set; 2 of these cards have the first 10 letters of the alphabet; the third has 10 hearts arranged like the pips on a playing card, but inside each heart are 4 marks; the fourth card is a man drawn in separate pieces, — the first piece is his hat, the second his head, then his neck, two arms, body, two legs, and two boots.

Table V.

RELATIVE PREPONDERANCE OF DIAGRAMS.

	Women. Men.		Men. W'n.
Squares	61—105	Circles	140—60
Equilateral triangles .	58— 95	Circles inscribed . .	56—22
Letters	52— 30	Rhombi	41—15
Diamonds	28— 44	Scrawls	32—14
Stars	28— 46	◿	27— 9
Faces to left . . .	21— 33	Men	21— 6
Houses	19— 35	Hearts	20— 9
Flowers	28— 11	◸	16— 5
Leaves	20— 25	Spirals	12— 4
Cubes	17— 24	Digits	12— 4
Scrolls	16— 16	Right angles . . .	11— 3
Inscribed squares . .	14— 18	Books	12— 3
Oblongs	15— 15	Trees	10— 3
Squares with crosses .	16— 11		
Octagons	13— 13		
Faces not in profile .	12— 14		
Hour-glasses . . .	11— 8		
Pentagons	11— 5		
Flags	6— 8		
Tools	6— 8		
Boots	6— 6		
Hands	6— 4		

Further insight into the peculiarities of these diagrams is gained by comparing the women and men. This cannot be done as accurately as desirable, because in some of the cards the names are given with the initials only, and when the persons were not known to the committee the cards had to be assumed to be from women or men according to the character of the handwriting. There is, therefore, a certain amount of error. But, of course, this error tends only to

mask the differences between men and women, since some of the women are tabulated with the men, and *vice versa.* It will be remembered that the number of men, 310, is nearly double that of women, 169 ; hence if the preponderances were perfectly regular in each sex, the men's cards ought to show nearly twice as many of a given diagram as the women's ; but this is by no means the case ; on the contrary, as shown by Table V., women's repetitions greatly preponderate ; yet there are curious exceptions, which cannot be considered accidental, — thus circles and right-angled triangles, under both the heads in which they appear, are on the men's side. On the other hand, that gentlemen preponderate with hearts, and ladies with hands, perhaps may seem to many a natural consequence of our social conditions. The general difference is, that there is much less variety among women than among men.

If the cards are examined, the great majority are found to have ten *different* diagrams upon them, the respondents apparently having assumed that the ten diagrams ought to be unlike one another. Hence it is evident that if we wish to measure the relative preponderance of the diagrams we shall reach the most accurate results by tabulating the number of cards on which the various diagrams occur, because most persons have thought that after they had drawn a given figure on their card they ought not to draw it again, and though it may have recurred to their mind and predominated there, they have not allowed — would not allow — their hand to put it on the card. In the following table the diagrams are arranged in order according to the number of cards on which they occur. The figures in the first column refer to the original manuscript tabulations of the committee.

TABLE VI.

No.	Diagram.	Men.	Women.	No Name.	Total.
8	Circles	135	60	7	202
7	Squares	100	60	8	168
4	Equilateral triangles	92	54	7	153
15	Crosses	80	40	4	124
9	Diamonds	44	27	8	79
50	Oblongs, horizontal	50	27	1	78
14	Stars	43	19	3	65
53	Circles with inscribed figures .	47	17	0	64
14	Houses	33	19	2	54
52	Rhombi	36	15	0	51
1	Profiles to left	28	16	3	47

TABLE VI. — *Continued.*

No.	Diagram.	Men.	Women.	No name.	Total.
10	Hexagons	28	12	1	41
13	Cubes	23	17	1	41
25	Letters of alphabet . . .	20	20	0	40
30	Other animals and heads .	22	12	5	39
34	Leaves	21	16	0	37
5	Right-angled triangle. △ . .	25	9	0	34
51	Oblongs, vertical	15	15	1	31
33	Flowers	10	17	3	30
49	Squares with crosses	11	15	3	29
60	Scrolls	16	13	0	29
16	Octagons	13	13	2	28
80	Squares with inscribed figures	15	11	0	26
21	Hearts	11	9	3	23
6	Right-angled triangles △ .	15	5	3	23
59	Scrawls	16	4	2	22
22	Moons	13	7	1	21
48	Figures of men	15	4	2	21
31	Hour-glasses ✕	8	11	1	20
3	Faces not in profile	10	7	1	18
76	Pentagons	5	11	1	17
44	Spirals	12	4	1	17
24	Card spots	12	4	1	17
11	Flags	8	6	2	16
63	Right angles	11	3	2	16
36	Books	12	3	0	15
32	Arrows	9	5	1	15
62	✿	8	4	1	13
54	Bottles	8	4	0	12
62	Digits	8	4	0	12
39	Trees	9	3	0	12
37	Ships	8	3	0	11
41	Boots	6	5	0	11
18	Mugs	7	2	1	10
26	Hands	4	6	0	10
40	Vases	6	4	0	10
20	Hats	4	5	0	9
23	Sun	5	2	2	9
27	Horses and horses' heads . .	7	2	0	9
29	Cats and cats' heads	4	3	2	9
43	Anchors	8	1	0	9
47	Apples	3	5	1	9
56	Eyes	6	2	1	9
77	Tools	5	4	0	9
2	Profiles to right	5	3	0	8
83	Dishes	2	6	0	8

TABLE VI. — *Concluded.*

No.	Diagram.	Men.	Women.	No name.	Total.
38	Branches	5	2	0	7
82	Steps	4	2	1	7
17	Pitchers	4	2	0	6
42	Keys	4	2	0	6
61	Skulls, or skull and cross bones	6	0	0	6
84	Signs of music	2	4	0	6
81	Punctuation marks	3	2	0	5
75	Engines	4	1	0	5
71	Feathers	3	2	0	5
68	Architectural plans	3	1	1	5
64	Watches and clocks . . .	4	1	0	5
28	Dogs and dogs' heads . . .	2	2	1	5
19	Chairs	2	3	0	5
66	Kites	3	1	0	4
70	Graves	3	1	0	4
72	Spoons	3	1	0	4
79	Musical instruments	2	2	0	4
65	Wheels	1	2	0	3
45	Pears	1	2	0	3
74	Forks	2	0	0	2
69	Candlesticks	2	0	0	2
35	Arms	1	1	0	2
73	Knives	1	0	0	1
67	Bells	0	1	0	1
58	Corkscrews . . . . , . .	1	0	0	1
55	Ears	1	0	0	1
46	Pineapples	1	0	0	1

There is one other manner in which we have sought to ascertain the order of precedence of the diagrams. The diagrams on each card have been numbered, beginning at the upper left hand corner, then across the card, then down and across again from left to right, following the succession natural in writing. The numbering, therefore, presumably corresponds approximately to the actual order in which the diagrams were drawn. The average of all these is, for instance, in the case of plain circles 3.9, which is therefore the average place of a plain circle, when it is drawn as one of the ten diagrams. The average places of diagrams 1–59, inclusive of Table I., are given in the following table. The figures in the first column refer to the original manuscript tabulations.

TABLE VII.

	Figure.	Place.		Figure.	Place.
4	Equilateral triangles .	2.6	25	Letters of alphabet .	5.7
7	Squares	3.2	37	Ships	5.7
6	Right-angled triangles △	3.8	33	Flowers	5.8
8	Circles	3.9	27	Horses	5.8
5	Right-angled triangle △	4.1	48	Figures of men . . .	5.8
3	Faces not in profile .	4.4	51	Oblongs, vertical . .	5.9
2	Faces, profile to right	4.5	62	Digits	6.
9	Diamonds	4.6	38	Branches	6.
50	Oblongs, horizontal .	4.6	47	Apples	6.3
1	Faces, profile to left .	4.7	40	Vases	6.3
34	Leaves	5.0	30	Other animals and heads	6.4
12	Stars	5.0	36	Books	6.4
52	Rhombi	5.0	24	Card spots	6.4
10	Hexagons	5.0	14	Houses	6.5
83	Dishes	5.1	43	Anchors	6.6
15	Crosses	5.2	80	Inscribed squares . .	6.6
84	Signs of music . . .	5.3	59	Scrawls	6.6
77	Tools	5.3	54	⬡	6.7
20	Hats	5.4	39	Trees	6.8
76	Pentagons	5.5	18	Mugs	6.8
53	Inscribed circles . .	5.5	26	Hands	6.8
82	Steps	5.5	60	Scrolls	6.9
13	Cubes	5.6	57	Bottles	6.9
23	Suns	5.6	22	Moons	7.
11	Flags	5.6	41	Boots	7.
49	Squares with crosses .	5.6	44	Spirals	7.1
21	Hearts	5.7	32	Arrows	7.1
16	Octagons	5.7	63	Right angles . . .	7.6
31	Hour-glasses ⨉ . .	5.7	29	Cats	7.8
56	Eyes	5.7			

I have now presented the data, which have been derived from the diagrams. I have next to lay before you the psychological deductions which appear to me warranted by those data, and finally to point out the bearing of those deductions on certain psychical experiments.

It is evident that the essential question is, what are the factors which lead to certain figures or classes of figures appearing so often, and the factors which produce the variety of figures which occur only a few times or once. We have a problem of visualization, — the mind is called upon to supply an optical image, and naturally offers

first that which is most accessible; sometimes that which is first offered is accepted at once, or again the decision hesitates, several images are offered, then a choice is made and one selected. There are two causes which undoubtedly lead a minority of persons to have special visual images stand prominently first, — to press to the fore on every occasion. The *first* cause alluded to is a mental trick.—the habitual occupation with some special figure, which accidentally and unconsciously is adopted by the mind. Such personal diagrams belong to certain individuals, — one might almost say the individual belongs to the diagram, so domineering is it in its incessant recurrence. A perfect example of this is afforded by one of our correspondents. Miss N. writes, " she has observed for years that the first form ($\mathcal{D}$) curiously possesses her, without her having the slightest explanation of the cause. Her papers are covered with it. The way she makes it is not as she writes $\mathfrak{D}$. Then the circular stroke is always up; in the former case it is always down, and the interior straight line is always added after the curve." Later she adds, " My nephew has a special feeling about the letter D. My nephew attributes his (and my) feeling to the fact that $\mathfrak{D}$ is the only letter whose curve in writing is made upwards and, so to speak, backwards, which gave him a great deal of trouble as a child, and he thinks it probably did *me!*" And again she adds, " I found yesterday that another nephew of mine has always been in the habit of making P's uniformly with the double stroke. He adds, as I feel, ' It looks so much better.' But it is sad to see the curve shrinking with the descending generations." Such tricks are very likely to be acquired, as we so often remark in the conversation of others, — the " Well's " and " Ah's," " Don't you know's," and other stop-gap interjections. So, too, it is probable that the diagram-trick is much more common than we are aware of, and that it accounts for a minority of the first figures drawn on the cards.

The second cause above alluded to is the sustained attention of the mind to certain objects constantly encountered in a person's regular daily occupation. A painter recalls his palette; a naturalist his butterfly; a physician his skull; a college student his bicycle; a member of this society his book; and so on, seriously and indefinitely. When the profession involves incessant consideration of special forms, then the images may always be lurking in the mind, on the watch, as it were, to come forward, and if there is the least demand for a visual image they press into notice. Pre-occupation so intense is rare; but among the five hundred cards, there are three on which every diagram indicates extreme and persistent attention to professional images,

A considerable number of the diagrams were, we may safely assume, suggested by the objects around the persons when they were making the diagrams, or some association of ideas, or by the recollection of objects or figures with which they had been specially or even only casually occupied shortly before. Data bearing on this point are given in Table IV. The image in these cases came to the mind from the outside; but the great majority of the diagrams are of such a character that we need not hesitate to designate them as thrown out from the mind, or as *ejective*. The ejective class of images claims our special attention.

The large majority of the cards exhibit very little or no real individuality. They are, of course, every one different from every other; but there is general uniformity, which is brought out with startling emphasis by Table VI. There we learn that 40% of the persons have drawn circles; 34% squares; 31% equilateral triangles; 25% crosses; 16% diamonds; etc. In fact, there are scarcely any cards with figures contained on no other card; by far the majority of the cards have several figures which are found more or less frequently on other cards.

With the exception of a very few, the diagrams are all simple in character. A glance at Table I. suffices to show that this is the case, and it is still more forcibly demonstrated by Tables II. and III. The persons drawing have evidently drawn as a rule what was easiest. In this manner we must account for the prevalence of faces seen in profile to the left, of left-handed spirals, of cubes and houses with the perspective lines running to the right. If any one will try making the diagrams just mentioned, he will, at least if right-handed, find it easier to make them as described than in the reverse positions.

We are all trained in the faith in individualism, and we are induced in numerous ways and almost incessantly to assign the highest value to the individual, and to the cultivation of individually distinctive qualities. We are also far more adept in perceiving differences than in recognizing resemblances; indeed, it is well known that ability to recognize resemblance, when it is masked, is one of the most distinctive traits of mental superiority and of genius itself. Two potent influences are confluent to make us exaggerate the differences between man and man, and they are abetted by each person's feeling that he is different from his neighbors. The consequence is that we too often and too easily forget our similarity, and forget that it stretches over trifling habits as well as over the great and little modes of thought. We feel, and for the most part willingly acknowledge, the likeness of our natures, but our sentiments and ideas we are over inclined to consider original. Such tests as the drawing

of the diagrams thrust home the conviction that even in trifles we differ but little. The images and notions which pass across the consciousness of each individual are almost all common property ; they are comparable to coins, — every one is a separate entity, but yet the stamp is the same. Our thoughts are in large measure owned by the community ; we are in mental matters all pure communists.

Such tests as the diagrams, on which this report is based, demonstrate the slightness of our real individual distinction and separation. The similarity is so great that the same visual images arise in many of us with approximately the same readiness.

We come here to a domain of psychology which has been but little and inadequately studied, namely, the frequency and readiness with which ideas recur. In a previous report in the Proceedings (*ante*, pp. 86) I have shown that even in so indifferent a matter as the ten digits, there are unconscious preferences of the mind, or, in other words, that the notions or images of certain digits come forward oftener and more readily than of others ; and I have also shown, *ante*, pp. 90–91, that the order of relative frequency is similar for different persons. It is probable that all ideas possess each its special degree of readiness of appearing in consciousness, and that the degree of readiness is approximately the same for a great many persons. This similarity probably also prevails in regard to the majority of ideas.

This aspect of our mental processes puts the problem of thought-transference in a somewhat different light from that in which we have been asked to view it. It is evident that if two persons are requested to think of some one thing of a class, such as a letter of the alphabet, a playing-card, a baptismal name, there is by no means an equal chance of their selecting any one ; on the contrary, there is not only the probability that they will think of a special one first, but there is a chance of their both thinking of the same one, for the relative frequency or preponderance of one idea or image out of a set has been shown to be similar for a number of people. In order to prove the reality of thought-transference, it must be demonstrated that the observed coincidence of thoughts can *not* be explained by the law of relative frequency.

Let us suppose by way of illustration that two persons make an experiment in thought-transference with diagrams. The agent draws a circle ; now, four persons out of ten are likely to draw a circle (see Table VI.), and to draw it near the beginning of a series of diagrams ; instead, therefore, of the chances of the percipient's drawing a circle being almost infinitely small, they are very great. The trial is proceeded with ; the circle having been drawn, it is probable that the next figure will be different, as our cards show ; the agent
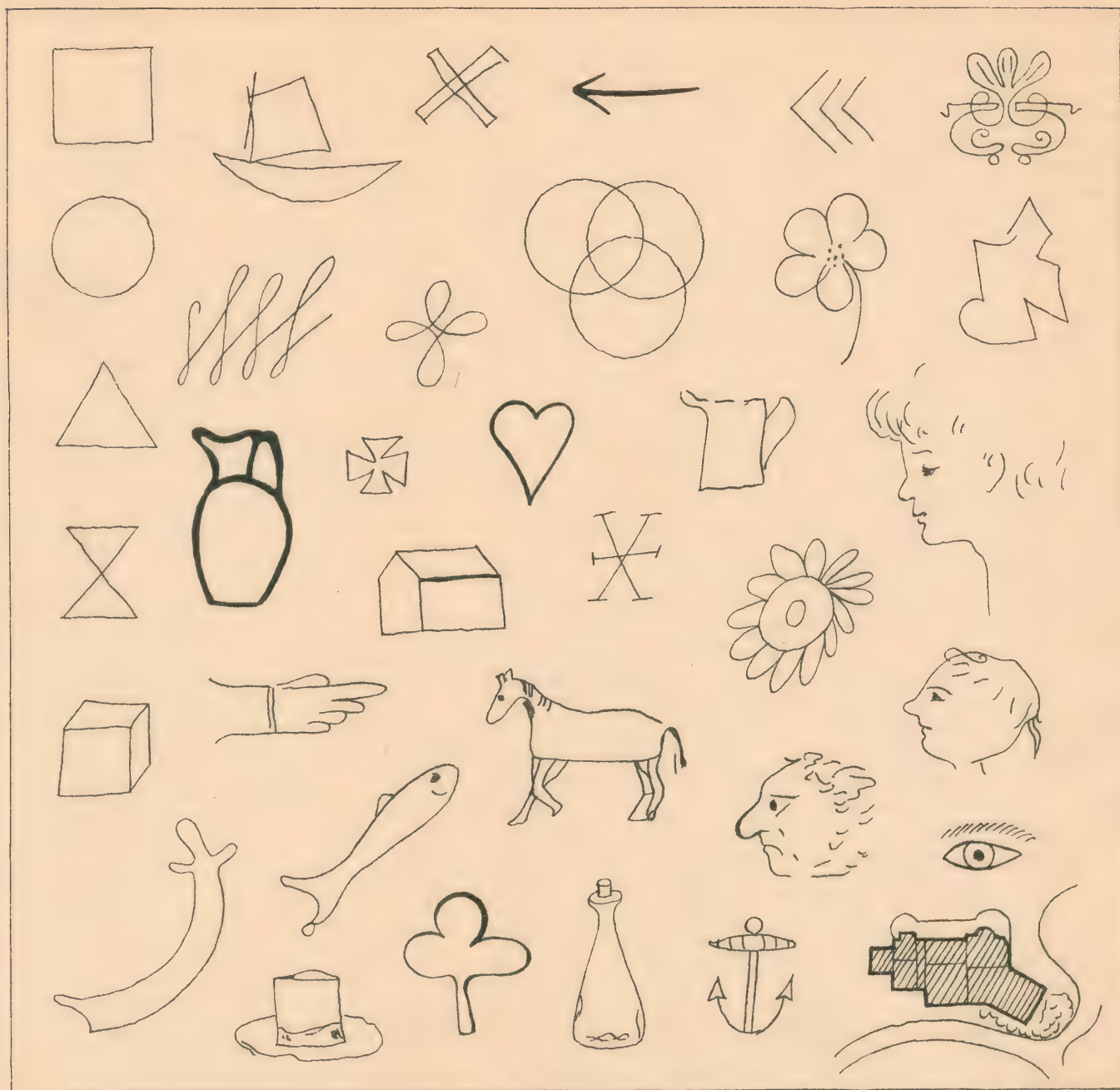
draws a square ; again the percipient's unconscious chances are very great. And so on with a considerable series of diagrams. In this manner thought-transference might be simulated, and a proof of its reality obtained, which would seem overwhelming so long as the law of relative frequency is disregarded as an explanation.

In the first report of the English Society for Psychical Research (Vol. 1, Part I.) there occur several expressions which show that the existence of the law of relative frequency of ideas was not known to the committee reporting. For example, p. 23, they say, "The chances against success in the case of *any* one card are, *of course*, 51 to 1," — the Italics are ours. On the contrary, the chances vary according to the card ; and if the card is not drawn at random from a full pack, but selected by some person thinking of it, the chances in favor of success are very much greater than 1 to 51. A similar criticism is applicable to the remark on p. 26, *l. c.:* " In the case of letters of the alphabet, of cards, and of numbers of two figures, the chances against success on a first trial would naturally be 25 to 1, 51 to 1, and 89 to 1, respectively." In the third report on thought-transference, *l. c.*, Part III., especially p. 173, similar statements are repeated, and it is added concerning the reproduction of drawings by Mr. Smith, when Mr. Blackburn acted as agent, " Here obviously an incalculable number of trials might be made, at any rate in the case of the more random and eccentric figures, before pure guess-work would hit upon a resemblance as near as that obtained in almost every case by Mr. G. A. Smith." We have to remember that "*pure* guess-work" is precisely what we are not dealing with. In Mr. Schmoll's article in the same Proceedings, Part XI., on the reproduction of diagrams by thought-transference, occurs the following sentence, p. 336 : " We have, therefore, been able to convince ourselves that the agents, concentrating their looks on the given object, projected on the mental eye of the percipient a picture more or less resembling it, and we take it as incontrovertible that the above results could not have been achieved by conscious or unconscious guessing."

If we examine the drawings given in the various articles above referred to, we notice at once that with the exception of a single series, those with Mr. G. A. Smith as percipient, the figures drawn by both the agents and percipients are in greater part just such as our diagram tests have shown to be the ones likely to be drawn. The authors of the articles in question having fundamentally misconceived the nature of the chances, of course fail to offer the necessary proof that the proportion of coincidences was greater than chance would account for. Until this is done it appears premature to accept these experiments as valid proofs of thought-transference.

There still are left the experiments with Mr. Smith and Mr. Blackburn. If we examine the diagrams reproduced in the Proceedings of the English Society, Part II., pp. 83–97, and Part III., pp. 175–215, we observe among them also a considerable proportion of the figures which are most likely to be drawn, so that, even under the assumption that everything was perfectly fair, the evidence is much less strong than the English committee have represented it. There remains to be considered the possibility of a code arranged between Mr. Blackburn and Mr. Smith. The English committee in their third report express themselves (Proceedings S. P. R., Part III., pp. 164, 165) very decidedly in regard to the possibility of a code. They have written: " Let our readers who may be familiar with the Morse or any other code of signals try in some such way to convey a description of some of our drawings to a friend who is blind-folded and has not seen the original ; we venture to assert that, even if audible signs were allowed, several minutes at least would be required to convey the notion of the figures correctly. It is probably no exaggeration to say that several scores, if not hundreds, of precise signs would be required to convey an idea as exact as that implied in many of Mr. Smith's representations." In the light of our present information this opinion must be renounced, and we must say instead that two or three signs, which might be variously combined, as in the Morse alphabet, would suffice to convey in a short time the precise ideas required ; and it must be added that very ample opportunity for such signalling was afforded in nearly all the Smith-Blackburn experiments. If the conditions as described in the third report of the English Society are considered, it will be evident at once that in at least a portion of the experiments sensory impressions could have been received by Mr. Smith from Mr. Blackburn, and of course any sort of impression could be utilized in a signalling code. If Messrs. Blackburn and Smith had observed that there are, say fifty diagrams which people are likely to draw, a code could have been easily arranged for the former to signal to the latter which one or two of the diagrams had been drawn. If, further, the code include signals for straight lines, for semicircular curves, for right, left, up and down, or below and above, it would not be very difficult nor require long for a couple of expert collusionists to accomplish the thought-transference of almost any of the diagrams in the series given in the pages cited. I do not bring any accusation against the two gentlemen who achieved the remarkable successes reported by the English committee ; I merely point out that the hypothesis of fraud still remains tenable, and that unless it is met adequately, persons of cautious judgment must consider that the explanation of the success of Mr. Smith in the

reproduction of drawings is more probably fraud than supersensuous thought-transference.

If this view is adopted, the general conclusion is unavoidable that none of the experiments heretofore published afford conclusive evidence of thought-transference.

The accompanying plate gives reproductions of the principal types of diagrams. The figures are all fac-similes of actual drawings on the cards.

CHARLES SEDGWICK MINOT.